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A brief biographical sketch of Professor Haridas Banerjee

Born on May 1, 1935 in Jamalpur, a small town in the district of Mymensingh of East Bengal (now Bangladesh), Haridas Banerjee had his early education in Pabna and Dacca. Soon after the partition of India, he migrated to Calcutta and appeared in school final examination in 1949 from Birbhum Zilla School in Suri. He did intermediate science from Presidency College, Calcutta and graduated with first class honours in Mathematics from St. Xavier's College, Calcutta.

After getting his Master's degree in Applied Mathematics in 1955 from the University of Calcutta, he joined IIT, Kharagpur, as Senior Research Fellow in September 1956 and decided to work on Quantum Field Theory. With his knowledge of Classical Physics only and that too acquired in a Mathematics Department, it was not an easy task, however. Besides, there was nobody in the faculty of IIT in those days knowledgeable on that subject. At that time he came across the newly published book, Theory of Photons and Electrons by J.M. Jauch amd F. Rohrlich in the library. The style and the contents of the book impressed him very much and it proved very helpful for his self-education. He completed his thesis calculating the polarisation effects and correlations in Bremsstrahlung, Mott scattering and Photoelectric effect. Being the first of its kind and topical, these calculations were used abundantly by experimentalists in the analysis of their data and were cited in many textbooks.

Prof. Jauch, one of the examinars of his Ph.D. thesis, straightaway invited him to join the Physics Department of Geneva University, well before he was formally awarded the degree in December 1959. Thus in October 1960 he joined the tenured position of Chef-de-Travaux in the University of Geneva. Here he was not particularly attracted to the topic, foundations of scattering theory, which was persued vigorously by Professor Jauch and his graduate students at that time. Instead, he concentrated on the phenomenon of spontaneous breaking of chiral symmetry suggested recently by Nambu and Jona-Lasinio. He never harboured seriously the idea of settling abroad, but cherished a desire to visit USA before resuming his career back in India. Thus, after a year, he resigned from his Geneva assignment and went in October 1961 to Carnegie Institute of Technology, Pittsburg and started working on S-matrix theory.

In October 1963 he returned to India to join the University of Delhi as a Reader in the Department of Physics and Astrophysics. After working there for about two years and a half, he finally joined the Saha Institute of Nuclear Physics in April 1966. It was here that he spent the long twenty-nine years

of his life, working on an equally long list of interesting problems. He would prefer working with others but on problems formulated by himself. In fact, all his colleagues in the Theoretical Nuclear Physics Division of the Saha Institute, who were interested in particle physics, were his coworkers at one time or the other. Also a total of ten students (one in Delhi and nine in Calcutta) worked with him getting their degrees.

At the Saha Institute his major works include sum rules for hadron scattering, explaining PCAC hypothesis and results of higher symmetries like SU(6) from the dispersiion theoretit point of view. He investigated the validity of eikonal approximation in field theory and developed a systematic approach to evaluate correction to it. He applied Landau's hydrodynamic model to investigate the multiparticle production in electron-positron scattering.

The tragic death of his wife, Sunanda Banerjee, in March 1984 threw him out of his normal life for a while. Returning slowly to full capacity, he turned his attention to non-abelian gauge field theories. Applying the point-splitting regularisation to such theories, he proposed a simple and clear derivation of the covariant and consistent anomalies. He defined a new gauge transformation, which in perturbative framework implements the standard gauge symmetry for the full field theory for both small and large gauge transformations. He showed that Witten's proof of inconsistency of SU(2) gauge theory of Weyl fermion is flawed and hence the question of consistency of such a theory is wide open. He proposed an alternative scenario of CP violation, where it is realised through a chiral phase in the quark mass matrix arising from chiral symmetry breaking in QCD. He advanced a resolution of the strong CP and U(1) problems through a novel representation of the conjugate Dirac field in Euclidean metric.

He worked at CERN as Visiting Scientific Associate twice, once in 1969-70 and then in 1982-83, each time for a year. He also visited the Institute for theoretical Physics in Berne in 1970-71 for a year. Apart from this he made several short visits to these institutions as well as to others like DESY in Hamburg, University of Gröningen in Holland and TIFR in Bombay. Among his physicist friends with whom he developed close contacts over the years, the names of Prof. L. van Hove, Prof. H. Leutwyler, Prof. S.M. Roy and Prof. V. Singh are notable.

He is a fellow of the Indian National Science Academy, of the Indian Physical Society and of the West Bengal Academy of Science and Technology.

At present he holds a five-year assignment as Senior Scientist of the Indian National Science Academy at the S.N.Bose National Centre for Basic Sciences, Calcutta. He is engaged now in working on the long standing problem of putting fermions on the lattice.

S. Mallik